FIT for Renewables? Design options for the Green Climate Fund to support renewable energy feed-in tariffs in developing countries

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FIT FOR RENEWABLES?

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KEY MESSAGES

- The Green Climate Fund is becoming a key UNFCCC climate finance institution, which aims to make a "significant and ambitious contribution" to global mitigation efforts.
- Renewable energy Feed-in Tariffs (REFIT) have been highly effective in many countries, and provide a proven example of a results-based climate finance instrument, if tuned carefully over time to be sustainable.
- A Renewable Energy FIT Facility or Fund at the GCF Private Sector Facility would be an ideal institutional home to implement REFITs at scale in developing countries.
- A prompt start of pilot activities should be implemented to build experience, including on how to measure, report and verify mitigation impacts of REFITs as supported Nationally Appropriate Mitigation Actions (NAMA) by developing countries.

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ACRONYMS

ADC	Advanced developing country
BMF	Business model framework
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CIF	Climate Investment Funds
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
COP	Conference of the Parties
CSP	Concentrated solar power
DECC	Department of Energy and Climate Change
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	(CDM) Executive Board
ESMAP	Energy Sector Management Assistance Programme
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse gas
GRF	GCF REFIT Facility
GW	Gigawatt
IGES	Institute of Global Environmental Strategies
IMF	International Monetary Fund
IIE	International Implementing Entity
IPCC	Intergovernmental Panel on Climate Change
KfW	German Development Bank (Kreditanstalt für Wiederaufbau)
kWh	Kilowatt hour
LDC	Least Developed Country
MIC	Middle income country
MFE	Multilateral funding entity
MRV	Measurement, Reporting and Verification
MWh	Megawatt hour
NAMA	Nationally Appropriate Mitigation Action
NMM	New Market Mechanism
NFE	National Funding Entity
NIE	National Implementing Entity
PIN	Project Information Note
PoA	Programme of Activities
PSF	Private Sector Facility
PV	(Solar) Photovoltaic
REFIT	Renewable Energy Feed-in Tariff
QA/QC	Quality Assurance and Quality Control
SB	Standardized Baseline
SREP	Scaling-Renewable Energy Programme
SDR	Special Drawing Rights
tCO2	Tonne of carbon dioxide
UNFCCC	United Nations Framework Convention on Climate Change

FOREWORD

From Anders Wijkman and Stefan Schurig:

The climate scientists unfortunately leave no doubt. The 5th Assessment Report of the International Panel on Climate Change of the United Nations (IPCC) launched in September 2013 states: "Warming of the climate system is unequivocal and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased."[1]

It is common knowledge that developing countries are most vulnerable to the devastating impacts of climate change already taking place in many parts of the world. However, it is equally important to mention that addressing the causes of human-induced climate change, chief among them the combustion of fossil fuels, would also risk making poverty reduction more difficult – and expensive – for low-income countries, not least in Africa. Investments in alternatives to fossil fuels may still appear to be more expensive too many observers, at least seen in a short-term perspective.

This being said, developments in both renewables and energy efficiency technologies have been very promising in the recent past. Over time, the costs for solar, wind and efficient biomass have been reduced significantly. This means that there are great opportunities to accelerate the economic development of many developing countries along a green trajectory. Transforming the energy infrastructure towards low-carbon technologies in both industrialized and developing countries is a critical component of the climate change action program that is absolutely necessary to prevent dangerous climate change.

With this report the WFC offers a timely and concrete contribution to the emerging design and architecture of the Green Climate Fund (GCF). The objective of the GCF is to "promote a paradigm shift towards low-emission and climate-resilient development pathways by providing support to developing countries to limit or reduce their greenhouse gas emissions and to adapt to the impacts of climate change." [2]The suggestions in this report are perfectly designed to meet this objective.

This report offers institutional design options – renewable energy feed-in tariffs - that would allow rapid implementation of renewable energy technologies in developing countries. A key element is that funding support through the feed-in tariffs would only be distributed against performance, i.e once the renewable energy technology provides electric power to the communities in need.

Anders Wijkman is a member of the World Future Council, co-president of the Club of Rome, former president of Globe EU and has been active on environmental and development issues for many years. As a member of the European Parliament (1999–2009) he focused on issues related to climate change, environment, development cooperation and humanitarian affairs. He is a former assistant secretary general of the United Nations and policy director of the UN Development Program. Wijkman is a member of the Royal Swedish Academy of Sciences.

Stefan Schurig is Director Climate Energy at the World Future Council. He initiated the international policy campaign on renewable energy and the worldwide promotion of 'Feed-in tariffs' policies. In 2004 he was appointed member of the REALISE Forum, an international platform on renewable energy policies led by the European Commission. Schurig authored and co-authored numerous publications on climate and energy issues including the concept-proposal for a Renewable Energy Policy Fund (2009). He works as a direct advisor for governments and parliamentarians around the globe.

1 IPCC WGI AR5 SPM-36 27 September 2013
2 www.gcffund.net

SUMMARY

Transforming the energy infrastructure towards low-carbon technologies in both industrialized and developing countries is a critical part of the global greenhouse gas mitigation efforts that are necessary to limit dangerous climate change. Renewable Energy Feed-in tariffs (REFIT) have been crucial policy instruments to rapidly expand renewable electricity generation in Europe, and have been taken up in a rapidly increasing number of countries outside Europe in the last years. This policy paper argues that the Green Climate Fund (GCF) should become a key UNFCCC vehicle to support further diffusion of REFITs in developing countries to a level that mobilizes the hundreds of gigawatts of renewable energies required for a 2° C stabilization scenario. The GCF aims at making a "significant and ambitious contribution" to these efforts, guided by the principles of the UNFCCC. As the GCF is currently still emerging, we offer institutional design options that would allow facilitating rapid implementation, provided there is a sufficient capitalization.

REFITs are fully consistent with the spirit of results-based financing and could be embedded within the GCF's Private Sector Facility (PSF). For an effective, efficient, flexible and scalable design, several important aspects require consideration. It is key to decide on the criteria for the support of REFITs ex ante, i.e. a tariff level that does not lead to overfunding, precise definitions of eligible technologies that prevent an exaggerated level of rent-seeking, a sufficient duration of REFIT payments in order to investments, availability of grid or mini-grid access and guarantees of payment from the off-taker, as well as credibility of the institution disbursing the REFIT. These criteria need to be differentiated in order to address different country circumstances. A critical question is how the modalities of a REFIT mechanism can be made compatible with (enhanced) direct access models to the GCF. A REFIT Committee could decide on applications from governments, but is likely to need evaluation support by independent expert reviewers or auditors. Even in a medium-sized country, a REFIT can trigger very large renewable energy investments of gigawatt (GW) scale, and thus the cost differential to conventional energy could reach several hundred million € per year. Therefore, it is crucial to differentiate the share of cost differential covered by the GCF according to country groups. LDCs could be entitled to coverage of the full differential, whereas the covered share would decline in middle income countries and advanced developing countries, respectively. The institutional setting would have to enable a transparent, but rapid adjustment of the REFIT support payment over time to prevent inefficiencies of REFIT support seen in several European systems.

Given that progress in the operationalization of the GCF currently is slow, a trust fund for a pilot phase of REFIT support could be set up quickly by a progressive group of donor governments in order to allow a rapid start. A trust fund of 1 billion € could finance 1-3 GW of renewables (see section 5). The trust fund should be designed with the clear aim of serving as a pilot phase for a REFIT funding window of the PSF.

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1. INTRODUCTION AND HISTORY OF THE IDEA OF A GLOBAL REFIT FUND

In light of the magnitude of the challenge of financing mitigation and adaptation efforts in the developing world, a critical challenge is how to ensure that financial flows to developing countries achieve the envisaged outcome cost-effectively.

Internationally, renewable energy feed-in tariffs (REFITs) have proven to be an effective means to rapidly increase the generation of renewable electricity; they have clearly outcompeted renewable quota trading systems, tender programmes or direct investment subsidies. REFITs have spread beyond industrialized countries and were applied by 65 countries and 27 states worldwide (GCF 2013d: 2) worldwide as of 2012. Therefore, REFITs have been instrumental to advance progress in renewable energy technology development, by enabling economy of scale effects to bring costs down more rapidly than even optimists had anticipated. Becker and Fischer's (2013) assessment of China, India and South Africa shows, however, that these large countries have preferred auction-based tariffs instead of classical FITs. Still, as long as there is a minimum level of confidence in government institutions, the strong advantage of REFITs compared to other renewables support policies is to provide investment security given that the tariff usually is made available for 10-20 years and there is a guarantee that the power produced will actually be taken by the grid operator and remunerated. This then induces financial institutions to provide loans to renewable power producers and leads to the emergence of a renewable electricity "ecosystem". This certainty is a critical aspect of the effectiveness of REFITs due to the long periods of time that are typically needed for energy production infrastructure development.

In many countries, REFITs are generally financed by a supplement to the electricity tariff of final users. This means that the end-users subsidize the additional cost of the REFIT as in many countries energy-intensive industry has been exempt in order to safeguard competitiveness. There has not been relevant opposition to this system, except in Germany where the surcharge has become so high that it now constitutes a significant share of the end user electricity cost. If available, however, this surcharge could also be replaced with other sources of funding.

Therefore, regarding efficiency of the policy scheme, the key challenge for REFITs is to avoid "overfunding" which could result if the electricity generation costs of renewable technologies fall while the REFIT is not adjusted in a timely manner. Such situations have occurred in the context of solar PV in Germany, Italy and Spain. Overfunding led to a massive expansion of renewable capacities. A simultaneous decrease in wholesale electricity prices and excessive exemptions for industry increased the consumer-financed cost differential, which raised concerns about energy costs. Policy-makers then overreacted, slashing REFITs to levels at which even the most efficient companies could not build renewable energy capacities.

As the availability of domestic finance is often a key barrier to rolling out REFITs in developing countries, there have been several attempts to introduce an international support scheme for REFITs. In 2009, the World Future Council was among the first to propose a "Renewable Energy Policy Fund", which would allow for replicating the positive experiences with REFITs in developing countries, financed from a range of innovative sources, including Special Drawing Rights of the International Monetary Fund (IMF) (WFC 2009). Building on this proposal, Deutsche Bank Climate Change Advisors proposed the GET FiT programme where grants and concessional loans would be given for FITs, combined with risk mitigation strategies through international guarantees and insurance, as well as technical assistance to address non-financial barriers (Deutsche Bank 2011). In countries in which

there are grid integration constraints or technologies have a limited in-country track record, "lighthouse" power purchase agreements can pave the way for fully-fledged subsequent REFITs. Currently, GET FiT is piloting its concept in Uganda (see 3.2).

Even beyond REFITs, "results-based financing" (RBF) is becoming increasingly relevant for international climate finance and renewable energy initiatives. For example, the Norwegian initiative Energy+ requires the introduction of a policy instrument such as feed-in tariffs, renewable certificate, off-take guarantee, tax exemption or tender programmes to trigger initial payments, followed by payments for measurable performance such as renewable energy produced (Norwegian government 2012). Given that international climate finance is slated to reach a level of 100 billion USD per year by 2020, a disbursement modality to maximize mitigation benefits is crucial. This is even more important as carbon markets that provided a performance-based benefit for mitigation initiatives are currently suffering from a meltdown of prices for emission credits, and thus currently do not provide a relevant incentive anymore.

ESMAP (2013) summarizes when and under which circumstances RBF is desirable in the context of the energy sector. They find that RBF is appropriate to allocate payments for environmental services, and that it increases the probability of achieving desired results. On the other hand, it could increase project costs, as the project developers will want to ensure that the projects perform, and will require interim – often commercial – financing with a higher interest rate, before RBF resources start to materialize. Monitoring and verification arrangements need to be perceived as trustworthy.

The Green Climate Fund (GCF) is to become the key vehicle of international climate finance [3]. Therefore, this paper discusses options how the GCF could support the roll-out of REFITs in the countries that require international support to implement REFITs at scale. In a broader perspective, Müller et al (2013b) discuss quantitative performance payments in the context of the GCF, which includes a brief discussion of the GET FiT pilot activity in Uganda, but does not focus on REFITs specifically.
Key elements that inform international financing of REFITs include

- Need for technical assistance to assess the renewable energy potential, and its cost structure, as well as design the administrative structure of the REFIT
- Support for political processes that overcome the resistance of incumbent electricity utilities and grid operators
- The cost differential between conventional electricity generation facilities and the different types of renewable electricity technologies, as well as adjustment procedures to trigger changes in the REFIT due to changes in the cost differential.
- The duration for which the REFIT is granted
- A mechanism to allocate limited GCF resources, e.g. country ceilings or caps (capacity / kWh generated), above which the REFIT is no longer granted.

Given that renewable energy provides substantial ancillary benefits such as reduction of local air pollution, an equitable approach would not cover the entire cost differential through GCF subsidies, but only the part of it which is not covered by ancillary benefits.

Therefore, at this early stage, reflections on a possible institutional design of a GCF REFIT Facility (GRF) raise many fundamental questions, and the need to address the following issues: What criteria are applied in order to safeguard effective use of limited available funds? Which countries can access the GRF, and how? Who decides about applications? Should there be a differentiation according to the development level of countries? How should the availability of other incentives (e.g. revenues from carbon market mechanisms)

3 No pledges to the GCF have been made so far, and its internal structure and procedures remain to be finalized. Most climate finance to date has flown through classical bilateral development assistance channels. We assume, however, that eventually the GCF will channel the lion's share of public climate finance.

be taken into account? Does the GRF provide finance for setting up or expanding REFITs, or does it provide a top-up/premium on existing or emerging REFITs, or a mix depending on the country context?

Although there is a lack of clarity on the direction which the GCF will take, we will attempt to come up with some useful suggestions for answers to these questions. First, a brief overview of the evolution of the GCF will be provided (2.), followed by a brief analysis of key design elements of REFITs as well as related precedents (3.). This analysis forms the basis for the subsequent suggestions for the institutional design of a GRF (4). In conclusion, some thoughts on possible next steps that would move this concept closer to implementation are presented.

2. STATUS QUO OF THE GCF

The Green Climate Fund (GCF) was first mentioned in the Copenhagen Accord of 2009, and is being operationalized slowly following the Cancun Conference of the Parties (COP) to the UNFCCC in 2010. A transitional committee prepared a decision of the Durban COP in 2011 on the "Governing Instrument" (GCF 2011), which installed the GCF as an entity of the financial mechanism of the UNFCCC, and elected its Board. This institutional nesting in the UNFCCC institutional landscape is a significant decision, although it is not yet entirely clear how the institutional linkages may emerge. In 2013, Heila Cheikhrouhou from Tunisia became the GCF's first director and its office in Songdo, Korea was set up. The UNFCCC Secretariat and the GEF Secretariat jointly set up the Interim Secretariat of the GCF as an autonomous unit within the UNFCCC Secretariat, which is accountable to the GCF Board. To date, the Board has met four times, and has produced a number of initial decisions.

The GCF is to channel "new, additional, adequate and predictable" international climate finance resources to developing countries (GCF 2011). Its key principles are guided by the UNFCCC, and include efficiency, effectiveness, equity, and contributing to a paradigm shift towards climate-resilient low-carbon development pathways (Mueller et al. 2013). The Governing Instrument specifies important, yet largely rudimentary rules of procedure for the Board, including its composition, the selection of Board members and their term, as well as basic rules for decision-making and observer participation; these have been supplemented by detailed "additional rules of procedure" (Schalatek 2013). Board meetings have been contentious, with North-South rifts emerging. Conflicts focus on whether the GCF should be the main or only a subsidiary instrument for public climate finance, the degree of oversight of the COP, the relevance of private finance for the GCF, and whether the GCF should follow the development bank model or the direct access route pioneered by the Adaptation Fund. Whereas industrialized country Board members prefer a "wholesale" model where the GCF funds are channelled through existing development banks and want a large role for private sector funds, developing country members would like to see a "retail" model with direct access and a limited role for the private sector. A key bone of contention has thus been the development of a "Business model framework" (BMF) which is to define the structure and organization of the GCF, the design of its private sector facility (PSF), disbursement routes and results-based financing modalities. The second Board meeting had decided to hire a consultancy but due to a fee seen as excessive the attempt aborted, and thus in the run-up to the third Board meeting submissions from governments and NGOs were solicited.

Thematically, the GCF will aim at achieving a balance between resource allocation for adaptation and mitigation. GCF (2013c) lists "Supporting the development, transfer and deployment at scale of low-carbon power generation" as a priority area for the mitigation side. Related performance indicators facilitate measuring achievement, and form the basis for the GCF's results frameworks (GCF 2013c: 17). Related to the power sector, the BMF

proposes either "deployment of low-carbon technologies", measurable e.g. in tCO2e reduced per kWh or in the number of households served. As REFITs typically focus on grid-connected electricity generation, the former is likely to be more relevant, although REFITs can also be adapted to mini-grid and offgrid technologies. Importantly, this indicates that GCF-funded activities are intended to account for their mitigation impact, for which appropriate frameworks for measuring, reporting and verification (MRV) need to be developed. In addition, the document on performance indicators also notes that renewable electricity generation has been a "popular option in CDM and other climate finance initiatives, however, mostly on a small-scale. This makes it difficult for the Fund to carve out a niche." Yet, REFITs can address important weaknesses with which the CDM has struggled (e.g. certainty on revenue streams, extensive baseline and additionality determination exercises). Therefore, a REFIT Fund is an ideal niche for the GCF.

2.1 ACCESS

The Governing Instrument (GCF 2011) states that access to funding should be "simplified and improved", country-driven and include direct access (para 31). According to para 45, national, regional and international implementing entities accredited by the Board should channel resources, as well as accredited international entities (the classical development finance institutions, para 48). Host countries can set up National Designated Authorities for recommendation of funding proposals to the Board. GCF (2013a) thus sees three access modalities: direct access through national implementing entities (NIEs), international access through development finance institutions (International Implementing Entities, IIEs) and an "enhanced access" model where financial intermediaries, national funding entities (NFEs) or multilateral funding entities (MFEs) are involved before NIEs or IIEs engage in implementation[4].

2.2 FINANCING INSTRUMENTS

As per the Governing Instrument (GCF 2011) "grants and concessional lending, and other modalities, instruments or facilities as may be approved by the Board" (para 54) are possible. Thus, the Board is very flexible. GCF (2013b) lists grants, concessional loans, guarantees and equity investments as key options, which are then tailored in specific sub-instruments. The loan category is differentiated into adaptable programme loans, development policy loans, sector investment loans, credit lines, concessional financing for waterfall payment mechanisms and debt swaps.

2.3. RESULTS-BASED FINANCING

GCF (2011) mentions the option of results-based financing and payment for verified results (para 59). Financing should "cover the identifiable additional costs of the investment necessary to make the project viable" (para 54). Results-based financing can have grant or loan elements; advanced market commitments and performance-based payments are also mentioned in GCF (2013b). The Board needs to apply a results measurement framework with guidelines and appropriate performance indicators (GCF 2011, para 58). The indicators proposed by the GCF (2013c) include "deployment of low-carbon power generation technologies (tCO2/kWh)". Such a criterion would fit nicely with a REFIT in which the number of kWh produced would be multiplied by a zero emission factor. However, developing country Board representatives may prefer to also take into account qualitative indicators which may allow for preferential treatment of activities with long-term transformative effects, such as improving the climate resilience of an electricity system.

2.4 PRIVATE SECTOR FACILITY

The PSF shall enable direct and indirect finance private sector mitigation (GCF 2011,

4 See Müller (2013) for a discussion of various options for institutional design of access to GCF Funds.

para 41), and relies on the same principles and performance indicators as the GCF. There shall be a focus on "local actors, including small and medium-sized enterprises and local financial intermediaries" (para 43). GCF (2013d) proposes the indicator of "dollars of new, predictable and additional private capital actually mobilized per dollar of PSF grant equivalent funding" for PSF evaluation. This document (p. 7) also proposes tariff support and guarantees for small scale renewables in order to overcome barriers linked to the affordability of the incremental tariff the credit-worthiness of the utility that would contract the supply from the private sector under a long-term power purchase agreement. It explicitly proposes that the PSF could fund the incremental tariff. For determination of the tariff level it sees the option of a "reverse auction involving pre-qualified bidders" (GCF 2013d, p. 7), although other options are possible, as long as they ensure competitive pricing while safeguarding investment certainty. Thus, the PSF seems highly appropriate to become a REFIT support facility. This could also allow for testing co-funding through revenues from market mechanisms.

2.5 CRITICAL ISSUES

Given that the first pledges to the GCF are only likely when the key design issues have been agreed, it will take at least until 2014 to generate resources of a scale sufficient to finance transformational initiatives like REFITs. Moreover, the allocation rules could still develop in the direction of the Adaptation Fund. Country-level ceilings would then direct the resources to small countries, and make it unlikely that large-scale policy initiatives in large countries would receive sufficient funding. In this context, the uncritical application of the "common but differentiated responsibility" principle could be a barrier for a large-scale REFIT scheme in the absence of sufficient resources. In addition, ideological opposition against the PSF by some developing country representatives may also raise obstacles to the combination of different forms of financing from private and public sources.

Despite these considerable uncertainties about the timelines, scale, and sources of financial resources of the GCF, it will be assumed that levels of climate finance will flow according to political agreements. As the purpose of this paper is to provide suggestions on possible institutional design options for a GCF REFIT Facility, the focus is consequently not on how to raise resources, but on how they can be effectively disbursed.

As a final brief note on the supply side of the GCF, the likely scale of required resources when introducing an international REFIT underlines the need for the GCF to draw on all available sources of finance, including from innovative sources such as carbon markets and international transport. The World Future Council (WFC) has contributed to this debate by proposing to use the ability of the IMF to create new international reserve money in the shape of Special Drawing Rights (SDR), which could be channeled to the GCF (WFC 2012). The IMF member states can decide on the issuance of new SDRs, which are usually distributed to them proportionate to their quota shares. Pursuant to agreeing on the formation of the GCF, member states should agree in advance to commit all or most of the new SDRs to the GCF. A small portion (e.g. 10% – 20%) could be claimed by the member states for the financing of specific climate protection projects.

As SDRs are not usually a medium of payment, the GCF would change the newly obtained SDRs into the required national currencies at the respective central banks. At that moment, the creation of new money in the currency of the IMF (SDRs) becomes a creation of new money in the equivalent national currencies. The basic principle is that the new money should be paid only against performance, i.e. for renewable energy development (WFC 2012).

3. KEY ELEMENTS OF REFITS AND EFFECTIVE POLICY INTEGRATION

There is ample experience with implementing REFITs internationally, using international climate finance (GEF, Climate Investment Funds), and market mechanisms (CDM) to promote renewable electricity generation. The lessons will be summarized below.

3.1 DESIGN OF REFITS

In order to achieve a long-term transformational impact of REFITs, several challenges need to be addressed:[5]

- Adjustment of REFITs over time through pre-determined degression rates and monitoring intervals to prevent overfunding and massive expansion of renewable capacity without cost reduction (see Leepa and Unfried 2013 for an assessment of overfunding in the context of German solar PV, as well as Zhang 2013 who sees rent seeking in many European REFITs).
- Differentiation of REFITs according to technologies. The exact specification of technology becomes very important in this context and it needs to be prevented that a skewed definition leads to rent capture by developers of a specific technology.
- Duration of REFIT payments. The longer the duration, the higher the probability that financial institutions are willing to provide financing. Looking at REFIT for European wind power, Zhang (2013) proves empirically that a longer duration increased investment. However, this effect will only materialize if the government / the institution administering the REFIT is seen as credible
- Grid access must be actually possible and not hampered by informal barriers. Zhang (2013) found that a grid access guarantee had a massive impact on wind power investment in European countries.

While an international organization like the GCF may be better placed than national institutions to withstand lobby pressure, direct access modalities may allow rent seekers on the national level to increase their rent because the GCF will face difficulties evaluating the situation on the ground with regards to technology costs and nature of barriers.

3.2 PRECEDENTS AND LESSONS FOR GCF-SUPPORTED REFITS FROM OTHER POLICY INSTRUMENTS

The importance of the energy sector for global mitigation efforts has already resulted in a broad range of carbon market and climate finance activities. Generally, climate finance for renewable energy has been most successful when synergies between different finance streams could be mobilized (Castro et al. 2011). This means that REFITs should not crowd out other policy instruments. The following passages will consider some key lessons from related precedents, including the above-mentioned GET FiT pilot in Uganda, the CDM and the Climate Investment Funds.

The GET FiT programme introduced above is currently beginning to be piloted in Uganda, financed by the German development bank (KfW) and the British Department of Energy and Climate Change (DECC). Barriers to be overcome are the low pre-existing FIT level in Uganda, a liquidity crisis at the state electricity utility that led to electricity providers requiring off-taker guarantees, and generally expensive debt finance. GET FiT targets small scale renewable electricity generation from hydro, biomass, and bagasse and is expected to leverage 300 million € which enable to add roughly 125 MW of renewable generation to the nation's grid within the next 3 – 5 years. GET Fit pays 1-2 USDct/kWh for hydro

5 For a more in-depth discussion of specific design options, please refer to Mendonca et al (2009) and Deutsche Bank (2011)

between 1-20MW, biomass, bagasse for 20 years, organizes MIGA guarantees and provides a Deutsche Bank-led debt facility. 50% of the net present value of the FIT subsidy will be paid up-front, the rest in subsequent instalments every five years (KfW 2012). The blend of output-based payments with grant components is an excellent example for how a pilot FIT activity can be financially structured in low-income countries.

Unfortunately, however, the GET FiT pilot in Uganda is setting a negative precedent as it does not allow projects receiving the FIT subsidy to utilize the CDM. Some of the eligible power plants had already been developed as CDM projects prior to GET FiT, and have sometimes even received public assistance for CDM capacity building activities from the same institutions that now finance GET FiT, for instance through the CDM SPEAR PoA. Due to the dominance of renewable energy projects in the global CDM portfolio, it can be expected that many of the most attractive FIT eligible projects have already been targeted as CDM projects or Programme of Activities (PoA). Therefore, some key aspects about possible interactions of a FIT Facility with the CDM will briefly be considered next.

The Clean Development Mechanism has now registered more than 7000 projects. 70% of these activities support renewable energy (URC 2013), mainly grid-connected renewable electricity generation. As of July 2013, the CDM pipeline includes projects and PoAs that would deliver an aggregated installed capacity of biomass (11.0 GW), geothermal (2.6 GW), hydro (115.0 GW), solar (7.9 GW), and wind (119.9 GW) (URC 2013). Some of these projects may become victims of the current carbon market price depression, or due to domestic challenges. Still, this noteworthy number of projects and their aggregated scale underlines the need to explore how CDM will interact with other mechanisms such as REFITs. From a CDM policy perspective, however, recent decisions on host country domestic energy policies clearly allow for linking CDM with REFITs for projects submitted for registration during the first seven years of their implementation. Moreover, the CDM provides a vast pool of regulatory experience and methodological tools, which could also be useful for instance to determine the mitigation impact of activities that are supported by a REFIT. Therefore, for the purposes this paper, the CDM will be mainly considered as a source of experience and as a methodological toolbox rather than a source of revenue. It is worth noting, however, that the latest GCF private sector facility decisions already include thoughts on PSF guarantee prices for CERs in order to mitigate uncertainty and allow to draw on carbon markets for co-financing (GCF 2013d: 7). From the perspective of the CDM's regulatory framework, a combination of CDM revenues with a REFIT is possible as long as all revenue streams are factored into a credible demonstration of additionality in the specific country circumstances.

Using the South African Power Pool as an example, Burian and Arens (2012) suggest another possible combination of a REFIT and carbon credit revenues, which would partly make the level of payments depending on carbon reductions rather than price increment. This arrangement could result in negative trade-offs with efficiency and investment certainty, and furthermore disadvantage low-income countries with a relatively high share of hydro-power, which frequently corresponds with suppressed demand.

The Climate Investment Funds (CIF) (Clean Technology Fund, Strategic Climate Fund) are the largest multilateral vehicles for international climate finance support for renewable energy. The CIF have stopped short of financing REFITs directly, and have followed established project financing practices of multilateral development banks relatively closely. While there are efforts to pursue a country-driven approach, there is no MRV system in place that would consistently measure mitigation impacts.

Yet, as the GCF aims to become a major contributor to mitigation efforts, it can be anticipated that there will be demands that mitigation effects will need to be measured more accurately. In this context, the concept of "supported NAMAs" could provide UNFCCC-compatible MRV frameworks, as well as contribute to mobilizing (bilateral) funding for REFITs. Therefore, it is recommended to design GCF-supported REFITs as

supported NAMAs. Actually, when the concept of NAMAs was still very young, Edkins et al. (2009) proposed to fund deployment of concentrating solar power in South Africa through a NAMA with a REFIT. However, due to political uncertainty about the future climate regime, the concept is only now beginning to move towards implementation. An increasing number of developing countries have now begun to develop NAMAs. Still, there continues to be an absence of regulatory guidance and modalities for NAMAs, as well as substantial financial support. Therefore, many NAMA concepts draw directly on CDM tools, e.g. for establishing baselines and MRV procedures. The CDM's methodological tools to determine baselines for grid-connected electricity generation and for monitoring performance are among the most streamlined (UNFCCC 2012). Therefore, it would be relatively simple to adjust these tools to the requirements of a REFIT MRV framework as part of a supported NAMA, which would not generate carbon credits, but provide information that is requested in the GCF performance indicators (Mt CO2 reduction/kWh).

Importantly, the relevance of this "mitigation layer" can be expected to increase in importance, as the 2015 agreement will have to place a higher share of the mitigation burden upon the shoulders of developing countries, according to formulas that still have to be determined. Still, it is already clear that it will be important to have robust and coherent accounting frameworks and MRV procedures in place in order to allow for comparability of efforts and to prevent double-counting of emission reductions.

4. CONCEPT FOR FIT SUPPORT BY THE GCF REFIT FACILITY

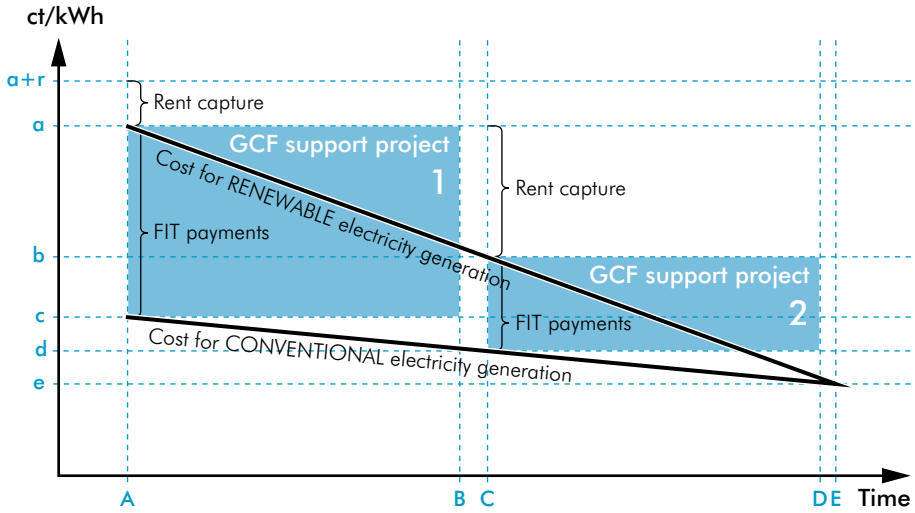
This section will develop a concept for how a dedicated GCF REFIT Facility that can use the GCF Secretariat could support REFITs in developing countries, taking into account the key challenges discussed in the sections above.

4.1 CRITERIA FOR SUPPORT OF FITS IN ORDER TO PREVENT OVERFUNDING

The REFIT support must fulfil the GCF criterion of covering the additional costs of a project to make it financially viable. This means that the GCF Board should decide on the principle that a REFIT will only be supported if it is not higher than the level required to make renewable electricity projects just competitive.
The decision parameters are shown in Figure 1. The upper downward-sloping curve shows the development of the levelized electricity costs of a renewable electricity technology over time, the lower curve those of the cheapest conventional electricity generation technology; it is assumed that the characteristics of the electricity from both technologies are the same. It is important to note that fuel costs for conventional electricity generation could risein the future, which could also lead to increasing conventional electricity generation costs. Such a development would make renewable electricity generation cost-competitive more rapidly.
The renewable electricity project 1 starting at time A will need a REFIT of level a for the time period A-B to become competitive with the fossil alternative. Thus the ideal level of support by the GRF is the blue rectangle A-B, a-c. However, some renewable lobby groups will try to increase the REFIT to the level a+r in order to capture rent. The GRF must be able to identify such attempts.

Renewable electricity project 2 starting at time C will only need a FIT of level b for the time period C-D to become competitive with the fossil alternative. Now, the ideal level of support by the GRF is the blue rectangle C-D, b-d, much less than the support for project 1. Had the REFIT level remained at level a, an enormous rent would accrue. At time E the costs become equal ("grid parity"). From that time, no REFIT is needed anymore, as renewables are fully competitive.

Figure 1: IDEAL SUPPORT LEVEL FOR FIT OVER TIME



Source: own illustration

4.2 EVALUATION OF THE KEY PARAMETERS OF FITS BY THE GRF

The REFIT support must be country-driven. Thus, the GRF will only act on the request by a government to support a REFIT. The GRF could support preparation and implementation of the REFIT, as well as the extension of an existing scheme, many of which are capped at a certain level of generation capacity due to budget constraints. The GRF should provide templates for support requests, and a procedure with clear timelines and responsibilities for evaluation of the proposals and decisions on whether support will be granted. Such procedures need to be transparent, and consider the multilateral context in which the GCF operates. Mueller et al (2013, p.8) lay out proposals for how requests can be dealt with, e.g. in a first-come, first-serve mode, in the form of "beauty contests", or even auctions. These criteria can be differentiated according to "respective capacities" of different countries (e.g. low-middle-high-income country).
To evaluate proposals for REFIT implementation support, the GCF Secretariat must be enabled to draw on an adequate technical support structure which has the skills to evaluate the following critical parameters of a REFIT (see also Heinrich Boell Foundation et al. 2013, pp. 14ff for an in-depth discussion of these parameters):

1. Tariff rate per kWh, and procedures for changing this rate for new power generation projects, as costs fall (see Figure 1). Heinrich Boell Foundation et al. (2013, p. 17) argue that the tariff should be based on the actual cost of generation plus a premium that allows sufficient returns on investment (usually 5-10% in the European context). The calculation of costs should not exclude relevant categories, meaning that investment costs, grid (connection)-related and administrative costs for licenses, operation and maintenance costs, fuel costs and decommissioning costs have to be covered.
2. In order to keep investor confidence, a regular schedule (e.g. every 2 years) for updating for new projects should be communicated from the start.
3. Differentiation by technology and scale: Precise definitions of eligible technology, and procedures for changing these definitions as technologies evolve. Unexpected technological breakthroughs, which may result in significant cost reductions, may create a big potential for rent seeking, if not acted upon quickly. Technology definitions can include size thresholds. Commonly, large hydropower plants have been excluded from REFITs on the grounds that they are already competitive. Where large plants are not excluded, they often get a lower REFIT.
4. Duration of REFIT payments (typically 15-20 years), and procedures for changing this duration for new power generation projects, as lifetimes of technologies change.
5. Necessity of guarantees for payment of power offtake. The GRF could link payment of REFIT support to the existence of a guarantee facility.
6. Availability of grid access, both in regulatory and physical terms – only once this is proven, would REFIT support be made available. This may include guidance on risks and responsibilities in case of defaulting (e.g. compensation payments if electricity cannot be transmitted or consumed by the utility).
7. Financing modality of the cost differential between conventional and renewable electricity remaining after the GRF contribution is deducted – progressive distribution of this financing according to the level of development (i.e. respective capacity). Structuring of support, blending of grants and loans.
8. Credibility of institution disbursing the REFIT funds, which could be a NIE under the GCF. The institution would have to prove that it fulfils relevant fiduciary and accountability standards. It would have to be discussed whether NIEs have to fulfil the same standards as IIEs. In order to promote direct access, blending with other investment guarantee vehicles may be required (GCF 2013d: 7).

Evaluation of FIT proposals by the GRF

There are three possibilities for evaluation: a) the GCF Secretariat does the evaluation inhouse, b) it commissions expert reviews, or c) it requires proponents to do an independent audit by a GCF-accredited auditor.

The inhouse option seems unrealistic as GCF staff will be unable to understand country-specific details that influence the key parameters. Commissioning of expert reviews seems promising as long as the roster of experts can cover specific expertise for all countries that apply. The GCF could provide a call for experts; it would have to be ensured that experts do not have a conflict of interest and that remuneration is sufficiently attractive to get good quality outcomes. This would be similar to the German system where tariff levels require studies by independent research institutions. The audit option has been applied under the CDM by establishing a system in which the CDM Executive Board accredited designated auditors (Designated Operational Entities, DOE). After initial problems, this arrangement became universally accepted. Transferring it to the GCF, however, will generate relatively high costs, unless domestic actors in the respective host country are more strongly involved.

Decision-making on proposals could be done on the level of a GCF REFIT Facility committee of the PSF. This committee could consist of two GCF Board members, two members of the highest body of the PSF, and two renewable energy policy experts, one each from a GCF donor and GCF recipient country. The GCF Board should only decide on the set of criteria and the evaluation principles. CDM experience has shown that deciding on specific proposals by the Board can lead to a high workload of the Board and its inability to decide on ground rules, whereas delegation of work into committees like the Meth Panel has enabled rapid development of a robust set of methodologies. As the UNFCCC and the GEF Secretariats form the interim GCF Secretariat, direct lesson-learning exercises may be desirable and possible.

The need for flexible and scalable frameworks

A relevant challenge will be to agree on criteria such as a maximum amount of funding being allocated to a specific REFIT and the parameters that could trigger a funding cap. Experience in industrialized countries have shown that capacity caps for REFITs led to "boom and bust" cycles that are deleterious to the renewables industry. Another key parameter is the share of the cost differential covered by the GCF. Here, country differentiation as per level of development could be implemented. For example, LDCs could receive full coverage, middle-income countries a significant coverage while advanced developing countries only a smaller share. The classification of countries as well as the shares funded for each class would have to be discussed in the negotiations about funding of the GCF given that the instrument could take up a significant share of the GCF's resources.

Table 1 below gives a rough estimate of the order of magnitude of payments a FIT would require depending on the size of the resource and the cost differential, as well as the share of cost differential covered by the GCF. The LDC example assumes an African country that expands hydro, with the entire cost differential being covered by the GCF. The middle income country (MIC) example would expand wind power in the trade wind zone; it would get coverage of half of the cost gap. The advanced developing country (ADC) has a mix of hydro and wind power potential, which is large. 20% of the cost gap would be covered by the GCF.

Table 1: ILLUSTRATIVE EXAMPLES FOR FUNDING REQUIREMENT FOR GCF REFIT

Country type	Installed renewables capacity (MW)	Plant load factor (%)	Cost differential (€ct/kWh)	Share of cost differential covered by GCF (%)	Type of support	Total GCF financing need (million € p.a.)
LDC	100	70	2	100	Grant	12.1
MIC	5000	40	4	50	Grant and concessional loan	350.4
ADC	30000	50	3	20	Concessional loan	788.4

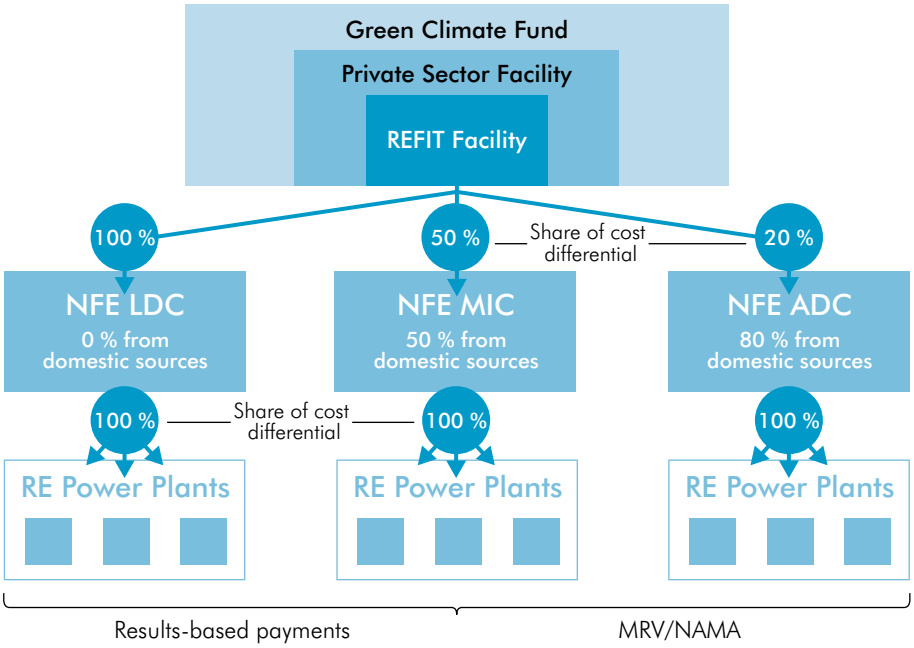
Note: The scale difference between the different country categories is not pre-determined; it is just frequently the case that the economically viable potential is higher in a large ADC than a small LDC.

The examples show that financing of REFITs requires significant resources even if the cost differential is small and only a part of it is covered by the GCF. Annual disbursements for REFITs in a dozen countries can therefore easily reach several billion €; they need to be sustained over several decades. If there is a front-loading of the whole or part of the REFIT payment towards the start of the project as in the case of the Ugandan GET FiT, the required short term funding would increase substantially. Front loading is problematic inasmuch it reduces incentives to operate the plant sustainably.

Institutional structure of GRF disbursements

Relying on domestic structures may allow for reducing the administrative burden on the GRF, while strengthening host country ownership (Müller et al 2013). This draws attention to the role of NFEs and NIE. There is a rapidly increasing number of emerging national climate funds, such as the Bangladeshi Climate Change Resilience Fund, the Brazilian Amazon Fund, or the Ethiopian CRGE Facility, which could serve as NFEs. Such an arrangement would allow designing a REFIT in a direct access model, in which a national climate fund is accredited as the NFE. These NFEs would then transfer these GCF resources to executing entities – i.e. developers of renewable electricity generation projects - based entirely on performance, e.g. as a premium to a domestic REFIT. As mentioned above, these activities would require an additional MRV layer that measures mitigation impacts as part of a supported NAMA framework. However, these NAMA components could also be coordinated by the NFE. Additional efforts can be expected to be small, as the main parameter is the amount of generated electricity which is monitored anyways, as well as the baseline for emission reductions. Figure 2 visualizes a simplified version of these arrangements, taking into account the differentiation in the share of the cost gap covered by the REFIT.

Figure 2: REFIT DISBURSEMENT STRUCTURE



Source: own illustration

These NFEs are likely to require some form of institutional capacity building support, but as they are already being set up and can be anticipated to seek GCF funding, it would be the most efficient arrangement to involve them. This institutional capacity could also facilitate disbursement for further GCF thematic windows.

Blending upfront and performance-based financing elements such as in the Ugandan GETFiT pilot may provide sufficient incentives to operate activities sustainably over the relatively long timelines. As concessional loans and grants are likely to be combined in a

large number of countries, the repayments of the loans contribute to replenishment. This would essentially create a revolving fund, which is an important precondition to reach the necessary scale.

5. WHAT CAN BE APPROPRIATE NEXT STEPS?

A prompt start that enables participants to build on practical experiences from pilot activities is an ideal precondition to build an evolving flexible and scalable design for a GCF REFIT Facility. Therefore, with the first funding of the GCF and the establishment of the PSF, a pilot REFIT support procedure should be set up. Ideally, it would support up to 3 small-medium sized countries, respectively, at different stages of development, and its results should be used to fine-tune the rules for broader REFIT support from 2015 onwards. Building on the initial proposal by the World Future Council (WFC 2009), we recommend to set up a multilateral trust fund for such a pilot. Such a fund could be set up directly as a GCF multilateral funding entity, or, if procedural constraints appear to be too prohibitive, also outside of the direct GCF context, but with clear trajectory towards an integration into the GCF's institutional landscape. An example using simple assumptions based on recent numbers for key parameters such as cost differential between technologies and plant load factors (see e.g. IPCC 2011) follows. If the duration of the REFIT payments is 15 years, the cost differential between renewables and conventional electricity technologies reaches 3 €ct and if the average share of cost differential covered reaches 50% the fund would need 1 billion € to fund close to 5 TWh per year. This could fund 2.85 GW of wind at 20% load factor, but only 0.76 GW of hydro at 75% load factor.

A procedure that is transparent and prevents overfunding should allow for building sufficient trust for industrialized countries to provide funding for a GCF REFIT support programme that would then expand to a scale where REFITs in large countries could realistically be covered. A REFIT programme for 100 GW, which is consistent with the expansion levels seen for the 2020s by IPCC (2011), at a load factor of 50% and a cost differential of 3 €ct would require 1.3 billion € per year if the full cost differential is covered; and this would have to be sustained over two decades. Such a REFIT programme should be framed under the concept of supported NAMAs, in order to make mitigation impacts transparent and quantifiable.

Setting up such a pilot REFIT Facility is likely to require a related institutional capacity building programme. Although many countries may have domestic experience with REFITs, the evolving GCF procedures are likely to require external support at least in the less advanced developing countries. Importantly, institutional and human capacity building needs also apply to the GCF itself, as the robust administration of such a large amount of financial resources requires not only the development of relevant procedures , but also a significant number of qualified personnel (Müller 2013, Ciplet et al. 2010)

In conclusion, it has been demonstrated that the GCF would be an ideal institution to promote renewable energy REFITs in developing countries. As mentioned initially, there needs to be a certain degree of caution with regard to when the GCF will be sufficiently capitalized. Mobilizing climate finance is a key issue of the UNFCCC process, and a range of proposals for possible sources of finance have been tabled, which also include the WFC (2012) proposal to issue IMF special drawing rights.
The comprehensive experience with REFITs, and their acceptance in many countries around the world offers the GCF a promising opportunity to successfully set up performance-based pilot activities which can also build trust in the GCF, thereby accelerating the process for other thematic windows and its overall success and effectiveness.

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